

Appendix D

Proposed road upgrades
Option 3



01	27-06-2016	ES	MM	Skd
Issue	Date	By	Chkd	Apprd

ARUP

Arup Financial Planning
 10 High Street, Melrose Arch, South Africa
 Private Suite No 93, Private Bag X1, Melrose Arch, 2076
 Tel: +2711 218 7600 Fax: +2711 218 7601
 www.arup.com

Client
Balwin Properties Ltd

Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Option 3 - Key Plan**

Job No
248841
 Drawing Status
For Information

Drawing No
D00
 Issue
01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg, CCBS. The information is derived from various sources and is not guaranteed to be accurate. Users of this information are advised to use this data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd
-------	------	----	------	-------



ARUP

Arup Transport Planning
 10 High Street, Melrose Arch, South Africa
 Private Suite No 93, Private Bag X1, Melrose Arch, 2076
 Tel: +2711 218 7600 Fax: +2711 218 7601
 www.arup.com

Client

Balwin Properties Ltd

Job Title

**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title

**Proposed Road Upgrades
 Option 3 - Section 1**

Job No

248841

Drawing No

D01

Drawing Status

For Information

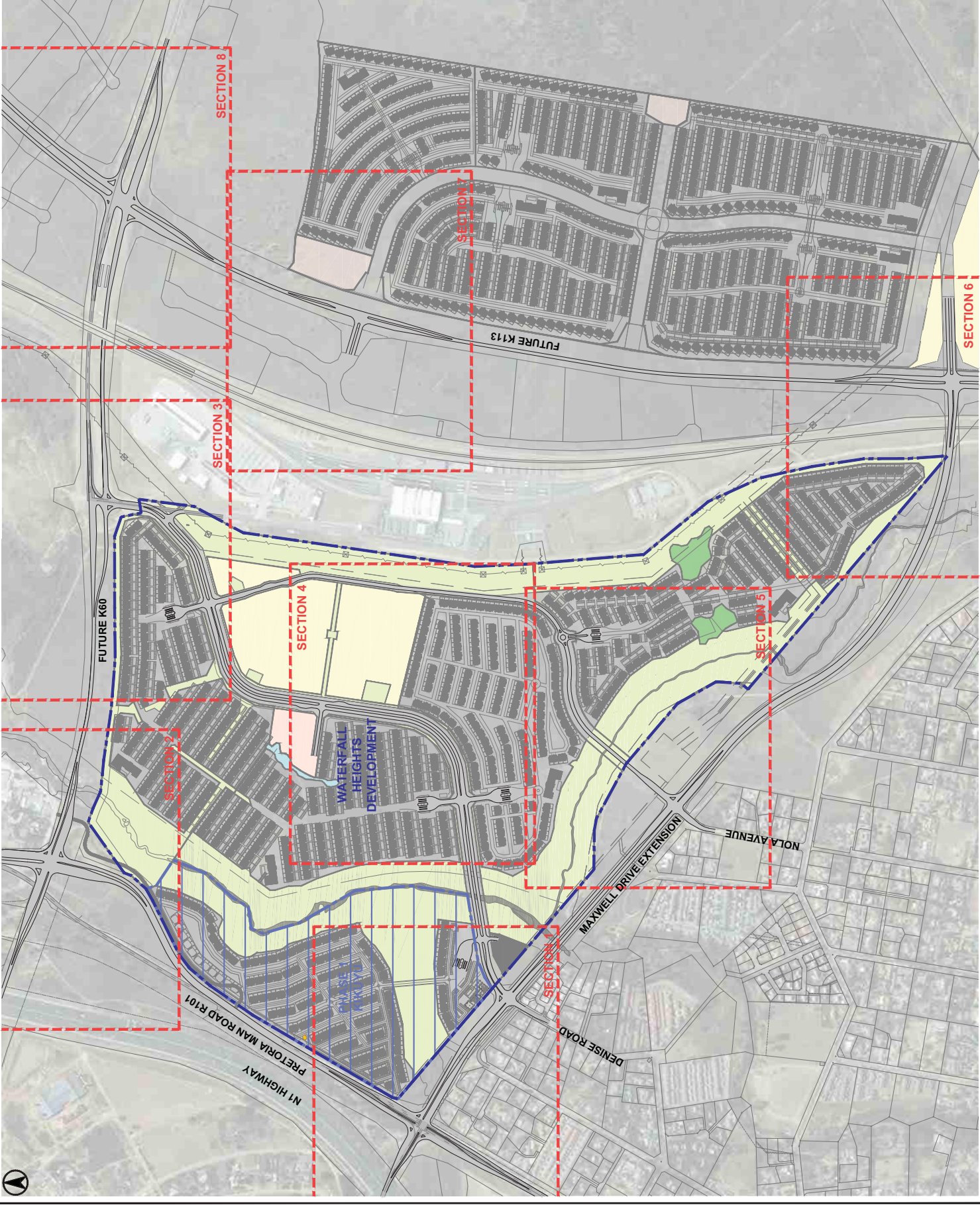
Issue

01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg. CGIS does not assume any liability for the damages arising from errors, omissions or the use of this information. Users of this information are advised to use this data accordingly.

Appendix E

Proposed road upgrades
Full development



01	27-06-2016	ES	MM	Svd
Issue	Date	By	Chkd	Apprd

ARUP

Arup Financial Planning
 10 High Street, Melrose Arch, South Africa
 Private Suite No 93, Private Bag X1, Melrose Arch, 2076
 Tel: +2711 218 7600 Fax: +2711 218 7601
 www.arup.com

Client
Balwin Properties Ltd

Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Key Plan**

Job No	Drawing Status
248841	For Information

Drawing No	Issue
E00	01

Source: The information is derived from the Computerized Geographical Information System (CGIS) database of the City of Johannesburg, CCBS. The information was selected to use the data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd



ARUP

Arup Financial Planning
 10 High Street, Melrose Arch, South Africa
 Po Box 93, Private Bag X1, Melrose Arch, 2076
 Tel: +27 11 218 7600 Fax: +27 11 218 7601
 www.arup.com

Client
Balwin Properties Ltd

Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Section 1**

Job No	Drawing Status
248841	For Information

Drawing No	Issue
E01	01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg, CCBS. CCBS does not assume any liability for the changes, errors, omissions or the use of this information. Users of this information are advised to use this data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd
-------	------	----	------	-------



ARUP

Arup Financial Planning
 10 High Street, Melrose Arch, South Africa
 Po Box 93, Private Bag X1, Melrose Arch, 2076
 Tel: +27 11 2 18 7 600 Fax: +27 11 2 18 7 601
 www.arup.com

Client
Balwin Properties Ltd

Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Section 2**

Job No	Drawing Status
248841	For Information

Drawing No	Issue
E02	01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg, CGIS does not assume any liability for the accuracy, reliability, completeness or the use of the information. Users of the information are advised to use the data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd



ARUP

Arup Transport Planning
 10 High Street, Melbourne Arch, South Africa
 Postal Suite No 93, Private Bag X1, Melrose Arch, 2076
 Tel: +2711 218 7600 Fax: +2711 218 7601
 www.arup.com

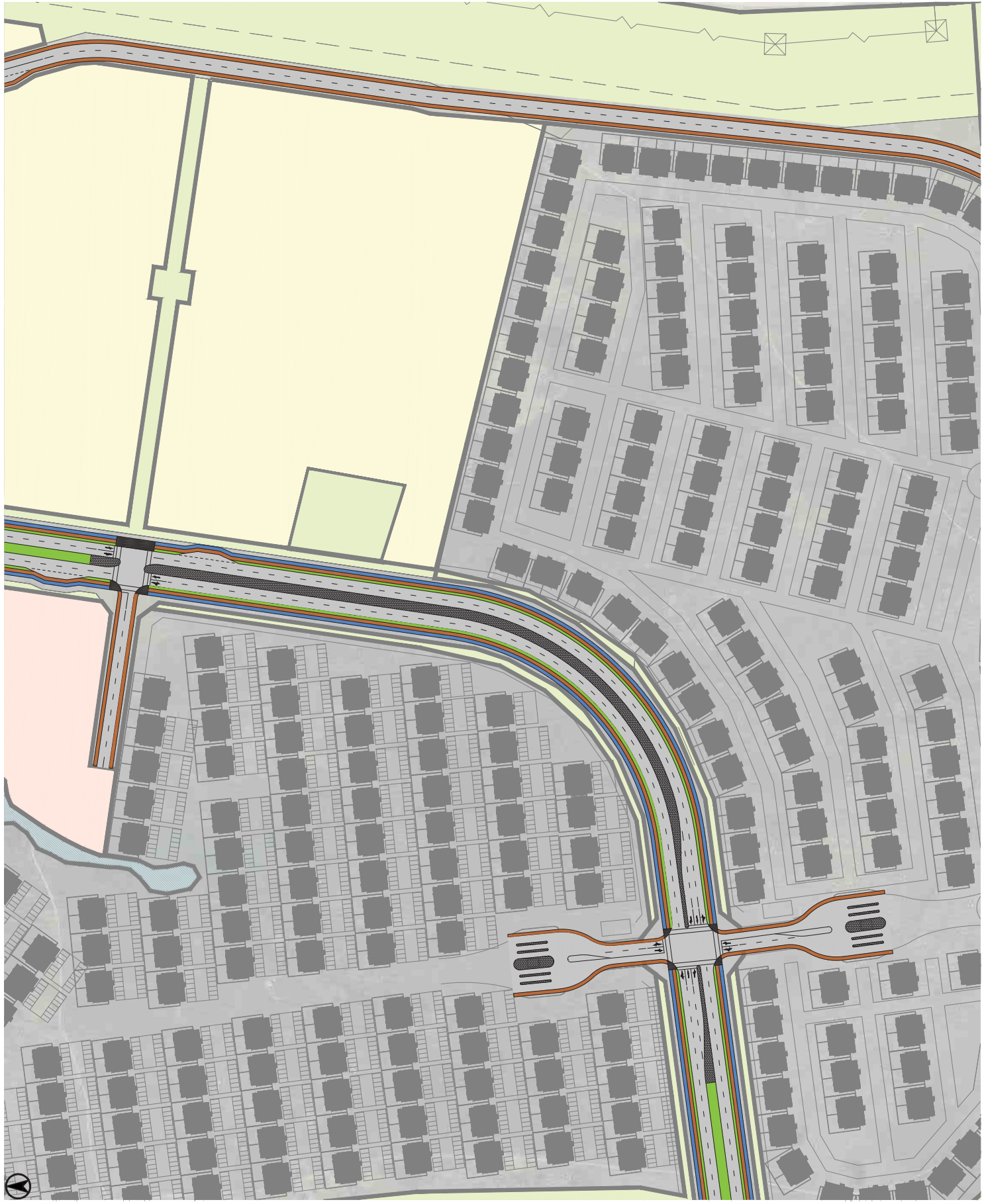
Client
Balwin Properties Ltd

Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Section 3**

Job No	Drawing Status
248841	For Information
Drawing No	Issue
E03	01

Source: The information is derived from the Corporate Geographical Information System (CGIS) Database of the City of Johannesburg, CCSE does not assume any liability for the damages arising from any use of this information. Users of this information are advised to use this data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd



ARUP

Arup Transport Planning
 10 High Street, Melbourne Arch, South Africa
 Po Box 103, Private Bag X1, Melrose Arch, 2076
 Tel: +27 11 2 18 7 600 Fax: +27 11 2 18 7 601
 www.arup.com

Client
Balwin Properties Ltd

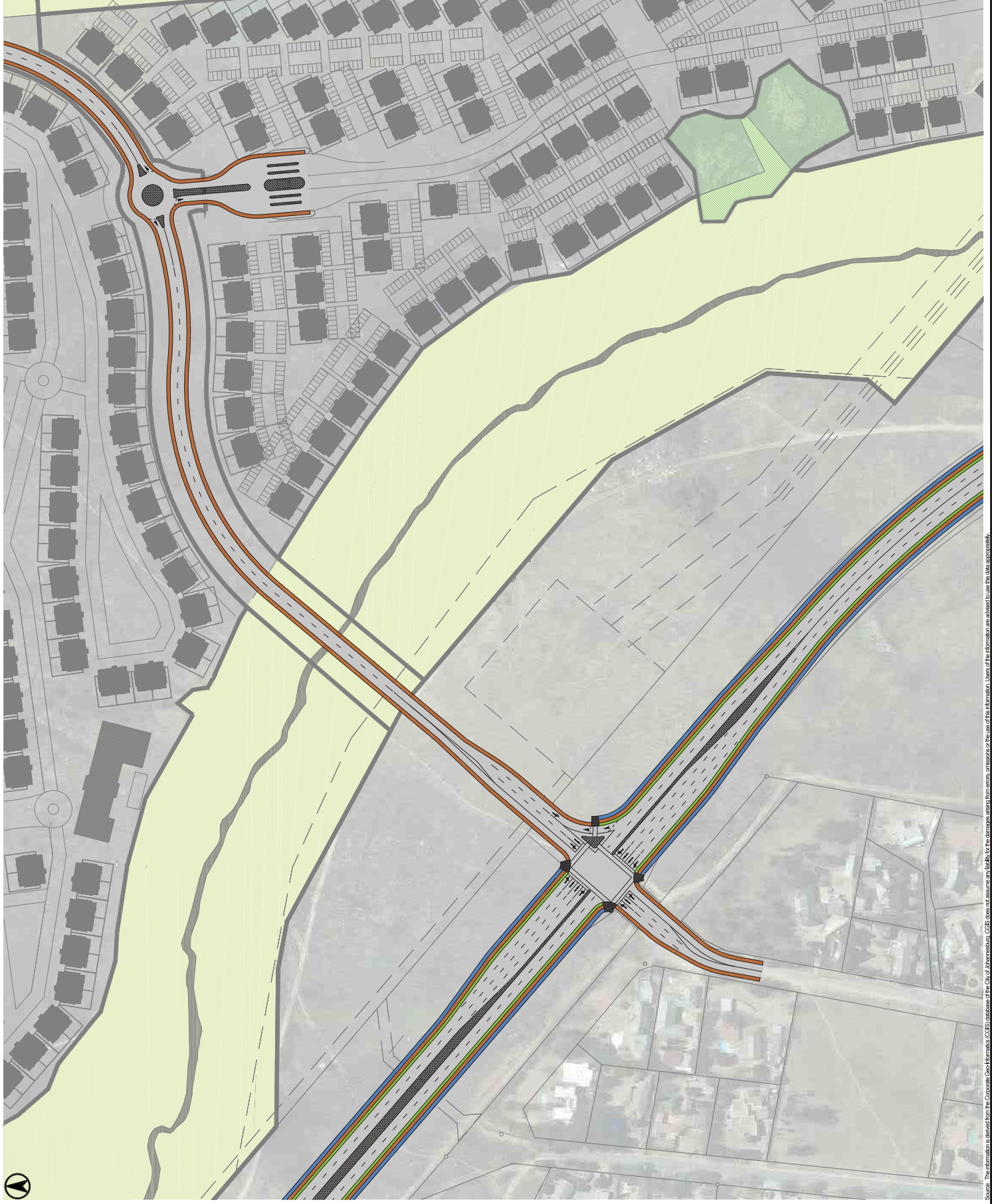
Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Section 4**

Job No	Drawing Status
248841	For Information

Drawing No	Issue
E04	01

Source: The information is derived from the Corporate Geodatabase (CGDB) database of the City of Johannesburg. CGDB does not assume any liability for the damages arising from errors, omissions or the use of this information. Users of this information are advised to use this data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd



ARUP

Arup Financial Planning
 10 High Street, Melrose Arch, South Africa
 Po Box 103, Private Bag X1, Melrose Arch, 2076
 Tel: +27 11 218 7600 Fax: +27 11 218 7601
 www.arup.com

Client
Balwin Properties Ltd

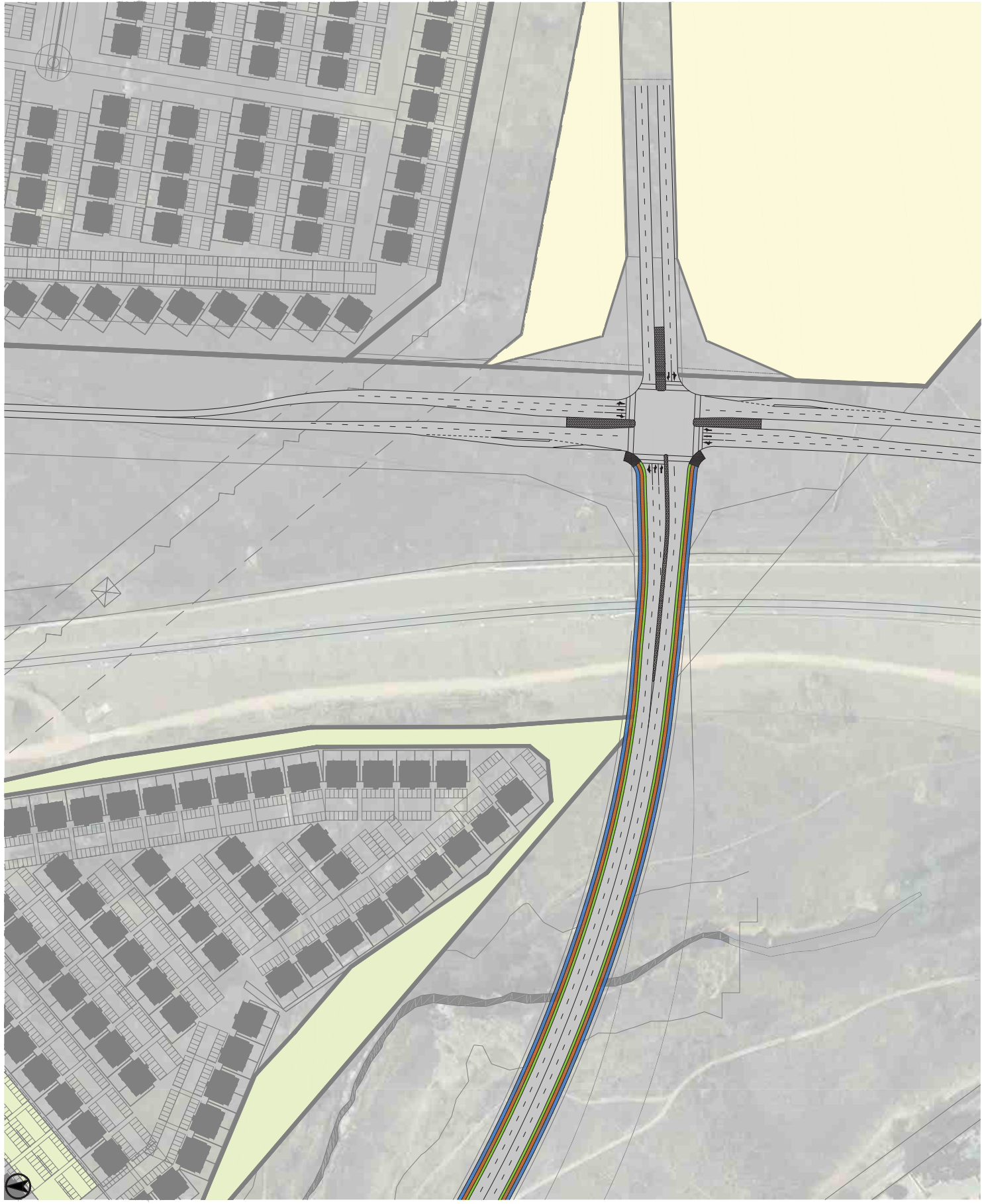
Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Section 5**

Job No	Drawing Status
248841	For Information

Drawing No	Issue
E05	01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg, CCBS. CGIS does not assume any liability for the damages arising from errors, omissions or the use of this information. Users of this information are advised to use this data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd



ARUP

Arup Financial Planning
 10 High Street, Melrose Arch, South Africa
 Private Suite No 93, Private Bag X1, Melrose Arch, 2076
 Tel: +27 11 2 18 7 600 Fax: +27 11 2 18 7 601
 www.arup.com

Client
Balwin Properties Ltd

Job Title
**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title
**Proposed Road Upgrades
 Full Development Upgrades - Section 6**

Job No	Drawing Status
248841	For Information

Drawing No	Issue
E06	01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg, CCBS. CCBS does not assume any liability for the damages, errors, omissions or the use of this information. Users of the information are advised to use this data accordingly.



01	27-06-2016	ES	MM	SKJ
----	------------	----	----	-----

Issue	Date	By	Chkd	Apprd



ARUP

Arup Transport Planning
 10 High Street, Melrose Arch, South Africa
 Po Box 93, Private Bag X1, Melrose Arch, 2076
 Tel: +27 11 218 7600 Fax: +27 11 218 7601
 www.arup.com

Client

Balwin Properties Ltd

Job Title

**Jukskei View Extension 128
 Kikuyu Residential Development
 Traffic Impact Assessment**

Drawing Title

**Proposed Road Upgrades
 Full Development Upgrades - Section 8**

Job No

248841

Drawing Status

For Information

Drawing No

E08

Issue

01

Source: The information is derived from the Corporate Geographical Information System (CGIS) database of the City of Johannesburg, CC&B. CC&B does not assume any liability for the damages arising from errors, omissions or the use of this information. Users of this information are advised to use this data accordingly.

APPENDIX G7: SERVICES REPORT

Jukskei View Extension 128

Situated Part of the Remainder of Portion 1 of the Farm Waterval 51R

OUTLINE SCHEME REPORT ON THE PROVISION OF WATER, SEWER, ROADS & STORMWATER SERVICES

Prepared for



Prepared by
C-PLAN CIVIL ENGINEERS (Pty) Ltd
459 Ontdekkers Road
Florida Hills
Roodepoort

PO Box 6622
Westgate
1734

Tel (011) 472-2277
Fax (011) 472-2305

Ref: 16532_outl Rev A
June 2016

<u>CONTENTS</u>	<u>PAGE</u>
<i>1. SCOPE OF REPORT</i>	3
<i>2. TOWNSHIP DESCRIPTION</i>	3
2.1 Locality	3
2.2 Layout	3
2.2.1 Landuse	3
2.2.1.1 Jukskei View Ext 128	3
2.2.1.1.1 Erf 1 (11.8183ha) & Erf 2 (2.2388ha)	3
2.2.1.1.1 Erf 3 (8.2547ha)	3
2.3 Description	3
2.4 Geology	4
2.5 Existing Services	4
2.5.1 Water	4
2.5.2 Sewer	4
2.5.3 Roads	4
2.5.4 Stormwater	4
<i>3. DESIGN GUIDELINES</i>	4
<i>4. WATER RETICULATION</i>	5
4.1 Layout and Design	5
4.2 Supply Pipe	5
4.3 Materials and Construction	6
<i>5. SEWER RETICULATION</i>	6
5.1 Layout and Design	6
5.2 Main Sewer Collection Pipe	7
5.3 Materials and Construction	7
<i>6. ROADS AND ACCESS</i>	7
6.1 Layouts and Geometrics	7
6.2 Pavement Design	7
6.3 Materials and Construction	7
<i>7. STORM WATER</i>	8

7.1 Layout and Design	8
7.2 Storm Water Attenuation	8
7.3 Materials and Construction	8
8. DRAWINGS	9
Town Planners Layout	7533/L1
Water Reticulation Proposal 1	16532-200-P01
Water Reticulation Proposal 2	16532-200-P02
Sewer Reticulation	16532-300-P01
Stormwater Reticulation	16532-400-P01
Roads Layout	3539-SPA100

1. SCOPE OF REPORT

This report deals with the provision of Water and Sewer Reticulation, Roads and Stormwater Drainage for Jukskei View Ext 128 on Portions of the Remainder of Portion 1 of the Farm Waterval 5-IR Johannesburg Metropolitan Municipality in the Gauteng Province.

Estimated Costs, based in this report, are given for the purposes of establishing guarantee amounts and service agreements only.

Provision of the Electrical reticulation has *not* been dealt with in this report.

2. TOWNSHIP DESCRIPTION

2.1 Locality

The proposed site is situated on Portions of the Remainder of Portion 1 of the Farm Waterval 5-IR Johannesburg Metropolitan Municipality in the Gauteng Province.

The site is bounded:-

West by Pretoria Main Road (R101)

North by the future K60

East by The Jukskei River

South by Sandra Avenue Buccluech Township & Furture Maxwell Drive.

2.2 Layout

2.2.1 Landuse

2.2.1.1 Jukskei View Ext 128

2.2.1.1.1 Erf 1 (11.8183ha) & Erf 2 (2.2388ha)

- Residential 3 – 91 units per hectre (Maximum 1240 dwelling units)
- Coverage – 60%
- F.A.R – 0.78

2.2.1.1.1 Erf 3 (8.2547ha)

- Private Open Space

Refer to attached Town Planners drawings 7533/L1 (05 May 2016)

2.3 Description

This area's elevation varies between 1482m and 1459 above mean sea level with an elevation difference of approximately 23m between the higher western portion and the lower northern portion. With an average fall around the site of $\pm 7.2\%$.

The site **is affected** by the 1:100 year flood, by the Jukskei River along the eastern boundary and a minor tributary of the Jukskei River which divides erf 1 & 2 on the southern section of the site.

The Jukskei River flows from south to north. A drainage channel also drains from the northeastern corner of the adjacent piece of land, Portion 74 of the farm Waterval 5iR, in an east-northeasterly direction towards the Jukskei River with on earth dam in this drainage channel close to the Jukskei River.

Less prominent drainage features also exists in which wet conditions and surface seepage may be experienced.

The site slope towards the Jukskei River. Drainage will be in the form of un-concentrated surface flow towards the existing drainage channels towards the Jukskei River.

Uncontrolled fill is placed in the northwestern corner of this area.

There are a few existing structures close to the R101. A few large trees situated on the sites.

Minor rock outcrops are present throughout this area.

2.4 Geology

According to the 1:250000 geological sheet, the site is underlain by gneiss, migmatite or porphyritic granodiorite of the Halfway House Granite.

A northwest-southeast striking syenite dyke and north-south striking diabase dyke are indicated within the south boundaries.

Prominent quartz veins also strike through the portion north of the Jukskei in a northwesterly direction.

J Louis Van Rooy carried out a Geotechnical investigation in August 2005.

2.5 Existing Services

2.5.1 Water

There are no council water mains within or along the boundaries of Jukskei View Ext 128.

There is an existing water reticulation within the existing Buccleuch & Frankenwald Ext 27 & 28. The existing council water mains within Buccleuch vary from 110mm dia to 160mm dia. There is an existing 400mm dia water main south of Buccleuch and north of Frankenwald Ext 27 & 28. This 400mm dia water main feeds of an 800mm dia water main which is supplied by the Linbro Park Reservoir. Two PRV's within the water reticulation regulate the flow. The difference in elevation from the Linbro Park reservoir to the lowest point in Buccleuch is approximately 150metres therefore there is adequate static pressure in the supply mains.

2.5.2 Sewer

The Bruma Outfall sewer traverses through the site roughly following the Jukskei River on the east. The Bruma Outfall Sewer is Ø2000mm Concrete pipe.

2.5.3 Roads

Road R101 (K101) Pretoria main road is on the western boundary of the site. Maxwell drive and K101 intersection is on the south west corner of the site. The Future K60 and the K60-K101 intersection is on the north west and northern boundary of the site respectively.

2.5.4 Stormwater

There are no formal stormwater systems within the boundaries of Jukskei View Ext 128. The Jukskei River flows from south to north on the eastern boundary of the site. The site is affected by the 1:100 year floodline.

3. DESIGN GUIDELINES

The design of the Township's services will be based on the design principles in the "Guidelines for the Provision of Engineering Services and Amenities in Residential Township Development" published by the department of Community Development and to the City of Johannesburg's requirements for engineering services. Local Authorities specific requirements and guidelines will also be adhered to.

A competent contractor through acceptable tender process will install all services. The General Conditions for the works of civil engineering construction, standard specification SABS 1200 and relevant particular specifications will pertain to the contract.

4. WATER RETICULATION

4.1 Layout and Design

Refer to drawing no. 16532-200-P01. A new Ø200mm water pipe will be laid next to the existing council water main from the intersection of Argyle Ave (Buccleuch) and the northern boundary of Frakenwald Ext 27. This new Ø200mm water main will connect into the existing Ø400mm water main. The new Ø200mm main route position is shown on drawing no. 16532-200-P01.

	Jukskei View Ext 128
Site Area	11.8183ha+2.2388ha=14.0571ha
Development Type	Residential 3
Coverage	60%
FAR	0.78
Number of Units	1240
Design Demand	34kl/ha/day
Average Annual Daily Demand l/s	5.532 l/s
Peak Factor	4.0
Peak flow	22.127 l/s
Design Pipe	200mm dia Class 16 High Impact
Peak Velocity	0.902m/s
Hydrant Flow	15 l/s @ 1.5 bar duration 1 hour
Instantaneous	15.0l/s(fire) 5.532 l/s (domestic)

4.2 Supply Pipe

From the above table the total instantaneous flow will be 22.127 l/s (domestic), therefore a 200mm dia uPVC water main will adequately supply the development. The 200mm dia uPVC water main will have a max velocity of 0.902m/s with peak domestic flow. The length of the water supply line from the tie in at the 400mm pipe to the site is ±2.5km.

4.3 Materials and Construction

It is proposed that all materials, construction and testing of the water reticulation comply with Johannesburg Water (PTY) LTD as well as compliant with SABS standards. All fire hydrants will meet the standard requirements of the Johannesburg Fire Department.

Class 16 pipes will be used for the new supply pipe. High impact Pipes with Victaulic type couplings will be used. The proposed new council water main will be constructed in the road reserves.

5. SEWER RETICULATION

5.1 Layout and Design

The layout of the proposed council sewerage reticulation is shown on drawing no. 16532-300- P01.

The new council sewer mains will be constructed as indicated on drawing 16532-300-P01. This pipe will be constructed outside the 1:100 year floodline. Servitudes will be registered over this sewer line. All sewer mains within the development will remain private, these sewers will gravitate to the lowest point on the site where the pipe will connect into the proposed new council sewer main. The council sewer main will connect into the existing Bruma Outfall sewer Ø2000mm. Tie in to the Bruma outfall will happen at an existing manhole.

Design Criteria:

	Jukskei View Ext 128
Site Area	11.8183ha+2.2388ha=14.0571ha
Development Type	Residential 3
Coverage	0.6
FAR	0.78
Number of Units	1240
Design Demand	30kl/ha/day
Average Annual Daily Demand l/s	4.881 l/s
Peak Factor	2.5
Infiltration	15%
Peak discharge	14.034 l/s

5.2 Main Sewer Collection Pipe

From the above calculations the Main sewer collection pipe will be a 200mm dia uPVC Class 400 @1:200 the velocity in the pipe will be 0.931m/s and flow depth of 101mm.

5.3 Materials and Construction

It is proposed that all materials, construction and testing of the sewer reticulation comply with Johannesburg Water (PTY) LTD as well as compliant with SABS standards.

uPVC Class 400 to SANS 1601 pipes will be used for the new council sewer mains. The proposed new council sewers will be constructed in the road reserves or in open spaces out of the 1:100 year floodline.

6. ROADS AND ACCESS

6.1 Layouts and Geometrics

The proposed layout is shown on drawing no 3539-SPA100.

The development will take access of Maxwell Drive Ext which is to be constructed by the developer. All road upgradings will be as per the Traffic Impact Study carried out by Arup. All the roads within the boundaries of Jukskei View Ext 128 will remain private and be maintained by a section 21 company.

All the required road upgrading will be based on the traffic study.

6.2 Pavement Design

The External road pavement layer design is proposed as:-

30mm/40mm Type TPA Medium Asphalt
150mm G1 Quality Crusher run compacted to 88% apparent density
150mm C3 Subbase compacted to 97% mod Aashto (G5 min)
150mm C4 Subbase compacted to 95% mod Aashto (G5 min)
150mm Upper Selected compacted to 93% mod Aashto (G7 min)
150mm Upper Selected compacted to 93% mod Aashto (G7 min)

The Road will be designed in accordance with “The Guidelines for the provision of Engineering Services and Amenities in Township Development”.

6.3 Materials and Construction

It is proposed that the materials, construction and testing of the roads should comply with the SABS 1200 specifications, except insofar as the Johannesburg Roads Agency requires these varied.

Kerbing will consist of Mountable (fig 8c), Barrier (fig 3) and Semi-mountable (fig 7). The kerbing will be in accordance with SABS 927.

7. STORM WATER

7.1 Layout and Design

Refer To drawing no. 16532-400-P01.

The storm water system within the development is to remain private and maintained by the Section 21 Company. The underground storm water system is designed for a 5-year recurrence interval. The roads acting as an overflow channel will manage all storms exceeding the 1: 5 year recurrences.

The stormwater attenuation dams will be constructed in the buffer zone between the site boundary and the 1:100 year floodline.

7.2 Storm Water Attenuation

There will be attenuation ponds for the control of stormwater within the development to be constructed within the buffers outside the 1:100 year floodline. The attenuation ponds will be designed as per the guidelines given by the Johannesburg Roads Agency, where the discharge post development will be equal or less than the discharge pre-development.

The design will incorporate the 1:25 and 1:5 year recurrence interval with a 15 minute storage capacity. The attenuation ponds will be maintained by the site's section 21 Company. The attenuation pond design will be submitted to the JRA for approval. Each stormwater attenuation dam will discharge into the Jukskei River. Prior to discharge into the Jukskei River the stormwater from the attenuation dams will pass through an energy dissipating structure to reduce the discharger velocity to less than 1.0m/s thus preventing any erosion.

The existing stormwater will therefore not be negatively affected by the new development.

7.3 Materials and Construction

It is proposed that the materials, construction and testing of the storm water system would comply with the SABS 1200 series of specifications.